ISAKOS CONGRESS 2025 | MUNICH GERMANY June 8–11

Identifying Unstable Ramp Lesions Using Ultrasonography

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Faculty Disclosure Information

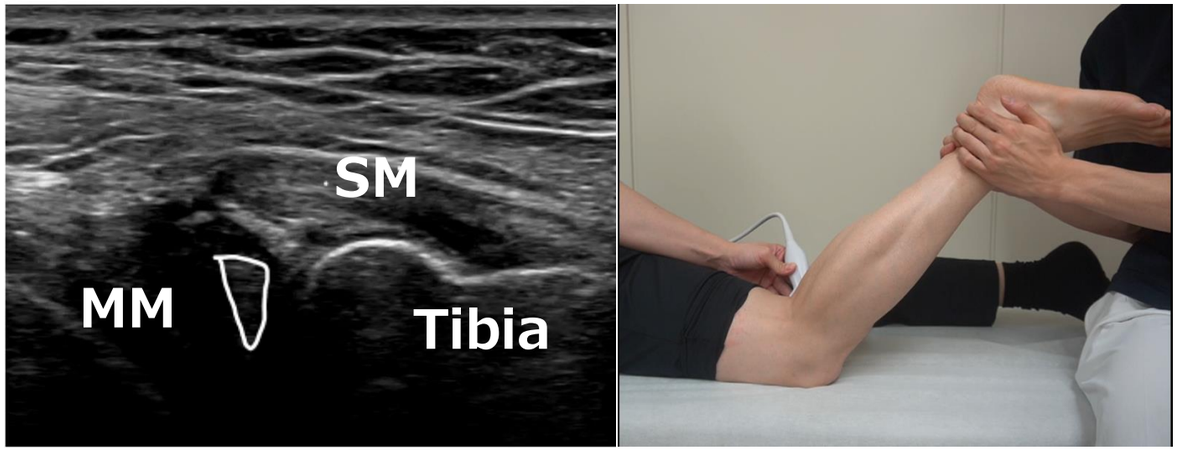
- There is nothing to disclosure

Ramp lesions should be considered before surgery

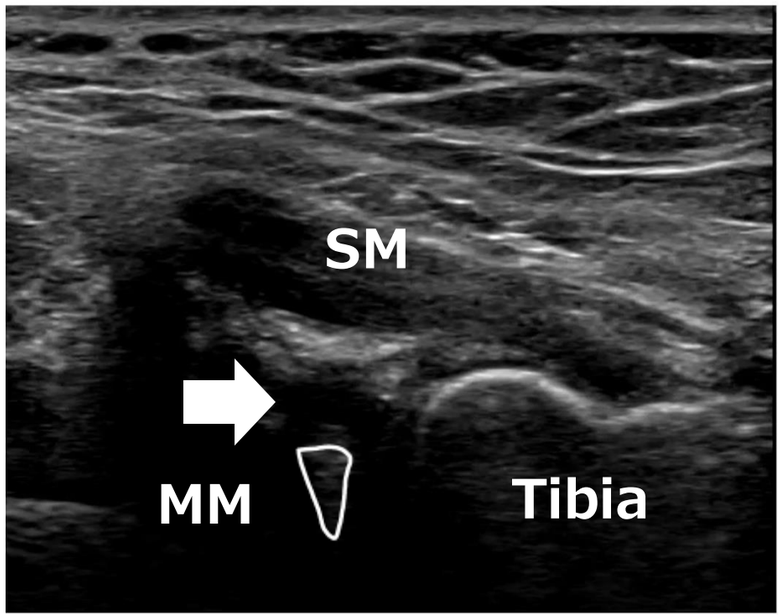
- **Meniscal ramp lesions** are posterior longitudinal tears at the meniscocapsular junction or meniscotibial ligament[1)]
- Ramp lesions cause **anterior instability** after anterior cruciate ligament (ACL) reconstruction[2)3)]
- Ramp lesions have a **low diagnostic rate** on MRI[4)] and may be missed in the arthroscope's anterior portal view[5)]

How to detect ramp lesions using Ultrasound(US) [6)]

relax



Isometric contraction



Knee flexed to approximately 70°

The probe is placed at approximately 90° just above the semimembranosus tendon to obtain a long-axis view

The white arrow indicates the ramp lesion

Purpose

To assess the use of US in evaluating ramp lesions preoperatively and intraoperatively

MM, medial meniscus; SM, semimembranosus

Participants

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Patients who underwent primary ACL reconstruction between 1/2022 and 6/2023

exclusion

Patients

-with a history of ipsilateral lower limb surgery

-with compound ligament injuries

82 knees

Age (years)	Sex (knees)
26.1 (±14.0)	male 51
	female 31

Participants

82 knees

MRI evaluation

US evaluation

- first visit our department
- the day of surgery

Arthroscopic findings

with ramp lesion

n=10

Without ramp lesion

n=72

Identified ramp lesion

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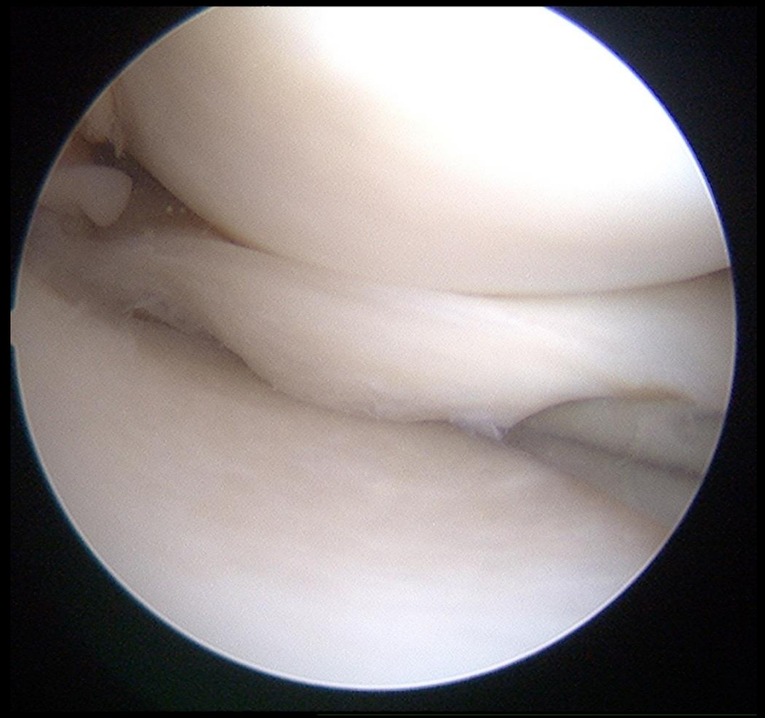
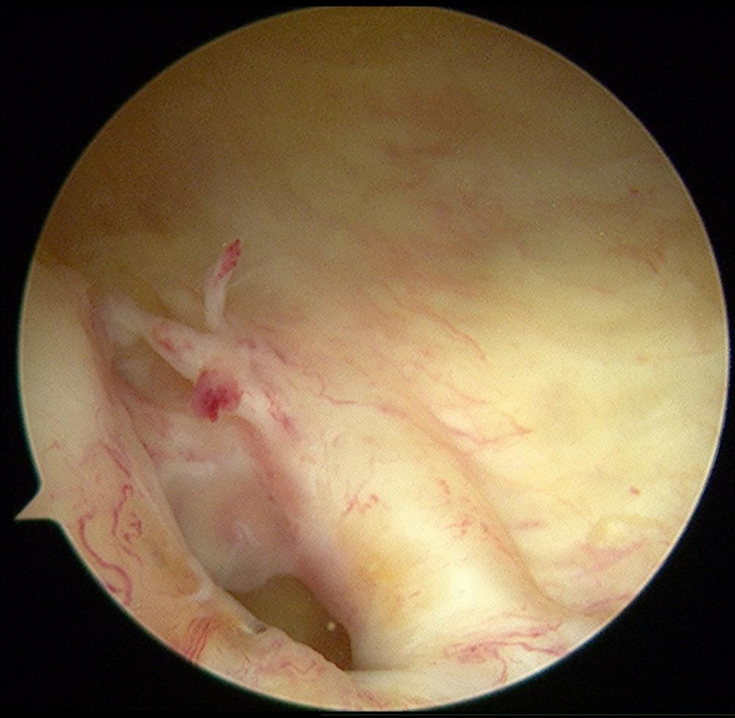
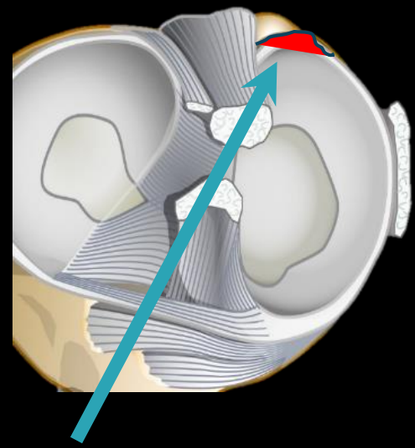
Ramp lesion is diagnosed when any of the following conditions apply







Intercondylar view

① No apparent damage could be identified through anterior portal visualization, but abnormal mobility was observed when probing the posterior segment of the medial meniscus

② Longitudinal tears between the posterior segment of the medial meniscus and capsule were observed in the trans-notch view

Classification of ramp lesion[7)]

	Description	Stability
Type 1	Meniscocapsular ligament tear	stable
Type 2	Partial superior peripheral posterior horn meniscal tear	stable
Type 3A	Partial inferior peripheral posterior horn meniscal tear	unstable
Type 3B	Meniscotibial ligament tear	unstable
Type 4A	Complete peripheral posterior horn meniscal tear	unstable
Type 4B	Complete meniscocapsular junction tear	unstable
Type 5	Double tear (peripheral posterior horn meniscal double tear)	unstable

Ramp lesions were present in 12.2% of cases (10 of 82 knees)

	With ramp lesion n=10	Without ramp lesion n=72	P -value
age (year)	26.2±11.0	26.1±14.4	0.489
male / female	5/5	46/26	0.201
height (cm)	167.3±5.4	166.5±8.3	0.385
weight (kg)	59.7±10.0	64.9±14.1	0.132
BMI (kg/m²)	21.2±2.8	23.3±4.3	0.074
Injury pattern contact/ non-contact	1 / 9	18 / 54	0.149

Case with ramp lesion

The detection rate of MRI → 60%

The detection rate of US (initial examination) → 90%

Case	Age & gender	Type	Identifiable Using MRI	Identifiable using US (first visit)	Identifiable using US (preoperatively)
1	14 F	4b	+	+	+
2	15 F	4b	+	+	+
3	17 F	2	+	-	-
4	21 F	2	+	+	-
5	36 M	5	+	+	+
6	22 F	3b	-	+	+
7	39 M	1	-	+	-
8	44 M	3b	-	+	+
9	20 M	4b	+	+	+
10	34 M	3b	-	+	+

Discussion

- In this study, the detection rate of ramp lesion is 60% with MRI and **90**% with US

→ **US allows observation of the knee joint in a flexed position, with flexible adjustment of flexion and rotation angles, facilitating a more precise assessment**

- The time of surgery, **22.2**% of patients with ramp lesions had poorly delineated lesions

→ **US delineation was poor when the ramp lesion was stable, as in cases 4 and 7**

Conclusion

Unstable ramp lesions complicating ACL injuries could be effectively detected using US

references

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5) Sonnery-Cottet B, et al. Long-term Graft Rupture Rates After Combined ACL and Anterolateral Ligament Reconstruction Versus Isolated ACL Reconstruction: A Matched-Pair Analysis From the SANTI Study Group. Am J Sports Med. 2021 Sep;49(11):2889-2897.

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7) Greif DN, et al. MRI appearance of the different meniscal ramp lesion types, with clinical and arthroscopic correlation. Skeletal Radiol. 2020 May;49(5):677-689.